

Headquarters U.S. Air Force

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Resilient Energy Demonstration Initiative Beale Air Force Base



6 September 2016

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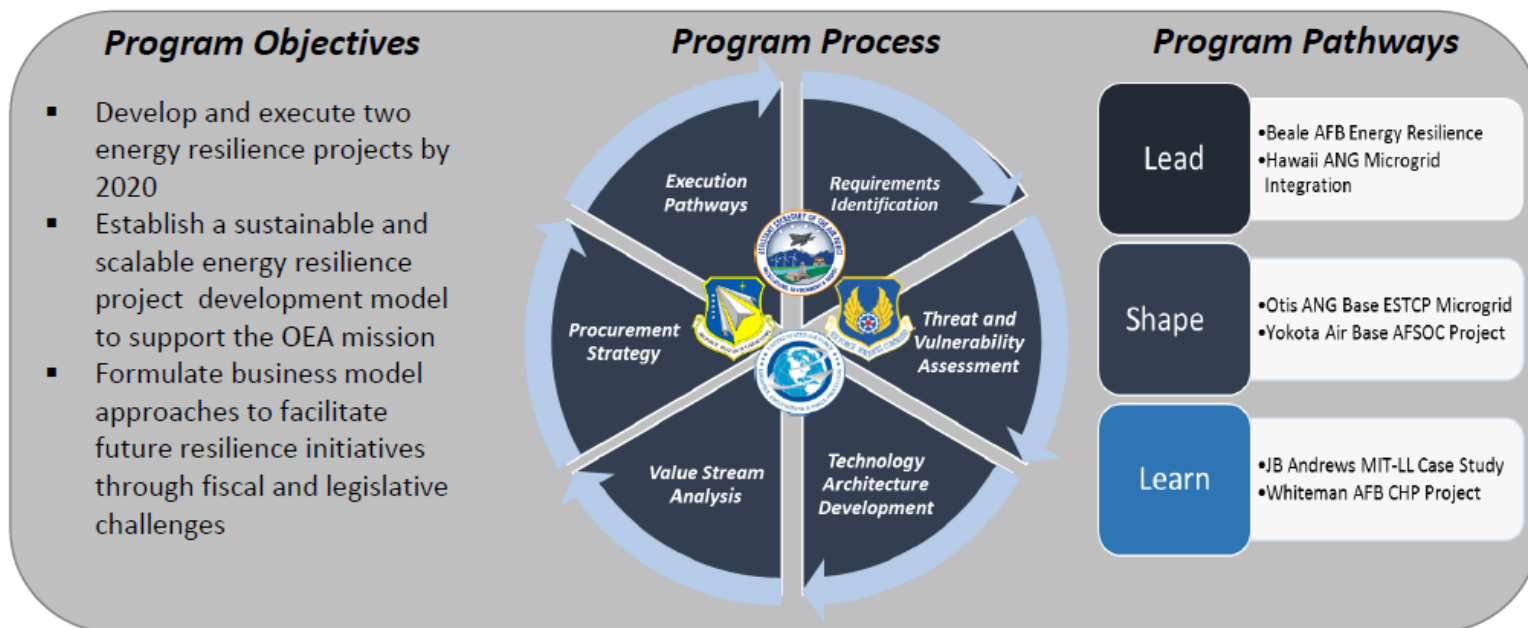
REDI

RESILIENT ENERGY DEMONSTRATION INITIATIVE

- **Mission Statement:** *Enhance mission assurance through energy assurance by developing and deploying innovative energy resilience technologies and business models across the Air Force Enterprise*

REDI Lead Project – Beale Air Force Base

Critical Mission • Partnership Opportunities • Committed Leadership



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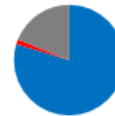
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Selection of Beale Air Force Base

- Beale Air Force Base (AFB) was selected as the REDI pathfinder to develop and demonstrate an energy assurance procurement strategy that focuses on mission requirements.
- Beale AFB was selected after considering the following criteria:
 - Mission Critical Demand
 - Installation-level Support and Data
 - State and Local Regulatory Environment
 - Technical and Economic Considerations



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■ Electricity
■ Fuel Oil
■ Nat Gas

Beale AFB
Marysville, California

Mission Critical Demand Requirement

- 9th Reconnaissance Wing – global high altitude surveillance and reconnaissance operations
- U-2 and RQ-4 reconnaissance aircraft & support equipment
- Expeditionary combat support forces
- 6 MW self-identified as peak critical power requirement (~40% Peak Demand) during OSD Power Resilience Exercise



Technical and Economic Considerations

- Cost of Electricity: 0.067 \$/kWh
- Peak Demand: 15.13 MW
- Electricity makes up 80% of commodity/fuel usage
- FY14 EUI: 86.14 Bbtu/GSF
- Utility Privatization:
 - Water – TBD
 - Electric – TBD
 - Gas – Delta Wireless, Inc. (2004)
- Installation Layout – TBD



State and Local Regulatory Environment

- California has a stringent RPS – 33% renewable by 2020, and 50% by 2030
- SMUD progress on microgrids is TBD
- Third-party assets and power sales, as well as demand response, are well established in CAISO
- California hosts many leading microgrids in the region, including the ones at the University of California-San Diego and the University of California-Irvine (though these are different control areas)



Installation-level Support and Data

- Complete reported data in AEMR
- Identified critical power requirement in OSD Energy Resilience Data Call
- Participated in NRG Case Study for “Evaporcool” a system to improve air-cooled chiller efficiency
- Solar panel installation in 2011





REDI Timeline and Strategy

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- A detailed and comprehensive execution strategy was developed for the REDI Beale AFB Project
- Three main phases: Announcement and Innovation, Site Selection and Assessment and Technology Architecture and Procurement Strategy

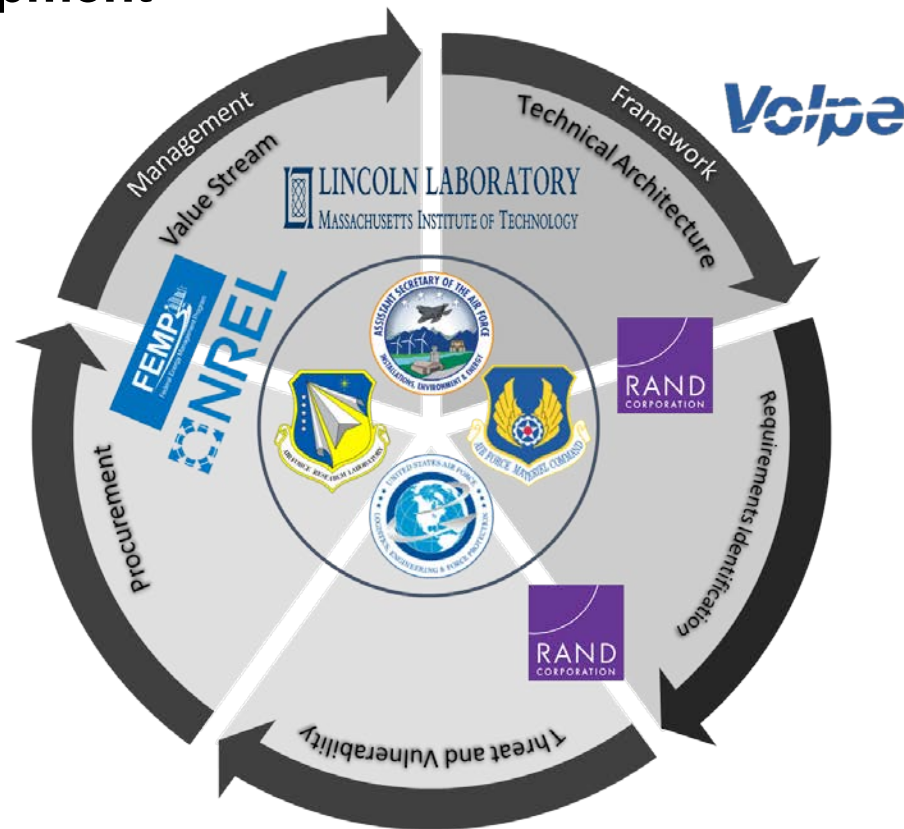
Days	0-30	30-150	150-365
Phase	1: Announcement and Innovation Call	2: Site Selection and Assessment	3: Technology Architecture and Procurement Strategy
		4: AF Enterprise Energy Resilience Framework	
Status	Complete	Complete	In-progress



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Site Assessment Team

- A team of energy resilience experts visited Beale AFB to identify mission and installation requirements, and provided that input to the RFI development

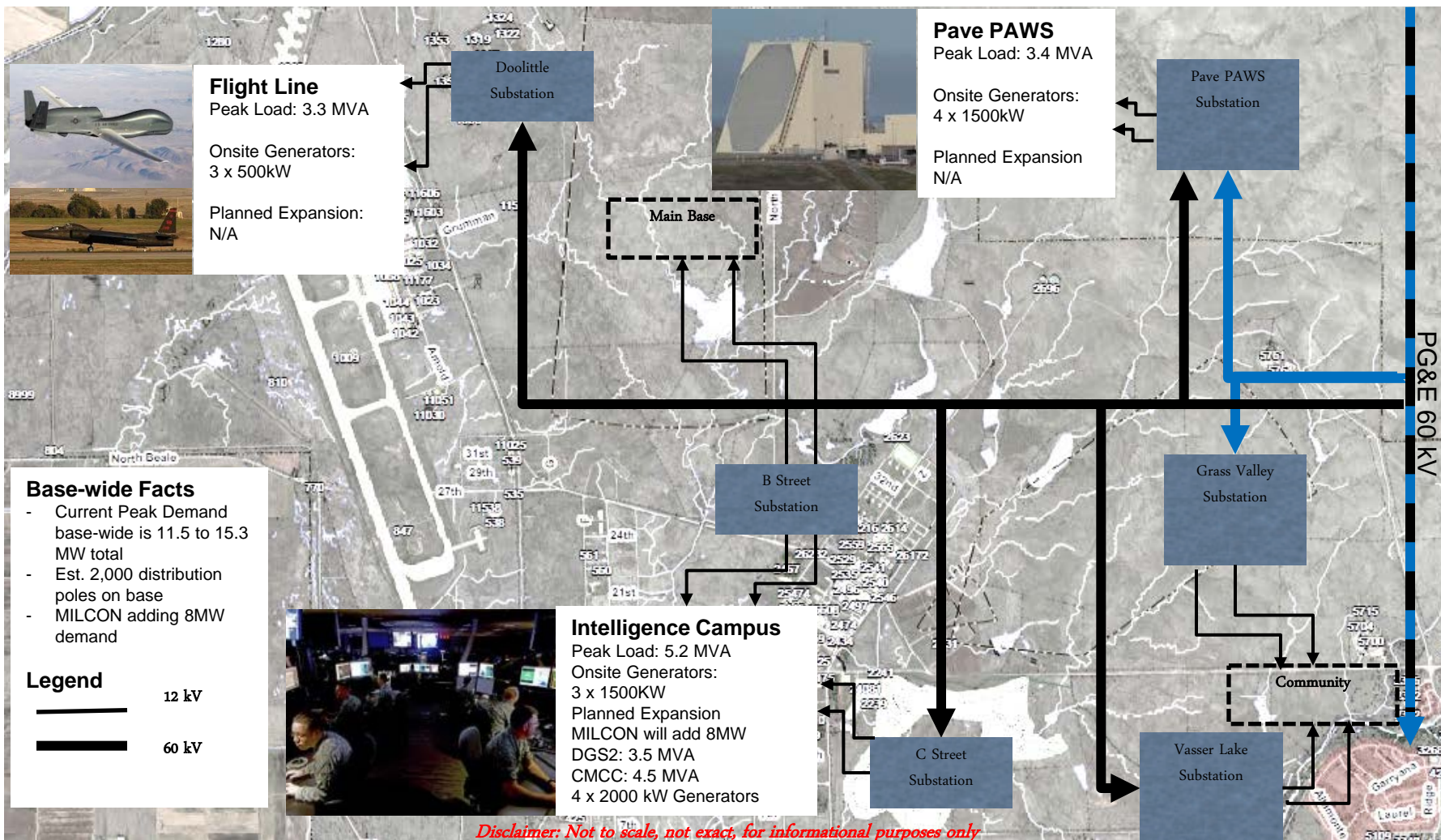


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Site Visit Outcome: Beale AFB Mission Decomposition



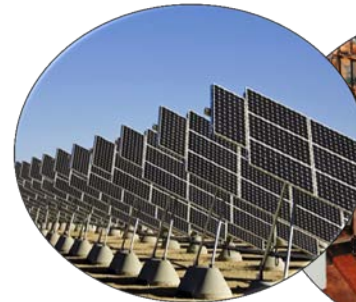


Desired Outcomes of RFI

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- **Develop an RFP that will:**
 - **Provide uninterrupted power to critical missions at Beale AFB**
 - **Enable a unique blend of financing opportunities to be used for the resilience energy solutions**
 - **Create a solution that will be used AF wide is replicable and scalable**

- **The RFP will allow for a wide variety of technology solutions:**
 - **Requirements-focused**
 - **Not “over-engineered”**
 - **Enhanced infrastructure and data package**





***Three lines of effort enhance
installation energy assurance.***

2 END-TO-END MISSION operations threads identified and analyzed

0 EXERCISES, WARGAMES, MISSION ANALYSES

1 OFFICE OF ENERGY ASSURANCE new center of excellence

10 LARGE-SCALE ENERGY assurance projects

Hawaii ANG Renewable Energy Master Plan
Including ECIP Phase I and II Areas and Air
Force Research Lab "Green" Energy Projects

2+ Resilient Energy Demonstration Initiatives

\$20m INVESTMENT IN
AFRL's Advanced
Power Technology
Office (APTO)